COST *and* MANAGEMENT

THE OFFICIAL JOURNAL
OF THE
CANADIAN SOCIETY OF COST ACCOUNTANTS
INCORPORATED 1920
HEAD OFFICE, 95 KING ST. EAST, TORONTO

VOL. 2. FEBRUARY, 1927 NO. 2.

CONTENTS

Page

FACTORY OVERHEADS AND THEIR DISTRIBUTION. By C. H. Black 2

THE OPERATION OF A MODERN COST SYSTEM
By L. Rhodes 11

COSTING LIFE INSURANCE
By J. H. Lithgow 21

NEW METHODS INCREASE PRODUCTION
By Henry P. Wherry 29

CHAPTER NOTES 38

POSITIONS DESIRED 40

Extra copies of this journal may be obtained at 50c each to members and $1 each to non-members.

Factory Overheads—Their Accumulation and Distribution

By C. H. BLACK
Cost Accountant, Dunlop Tire and Rubber Goods Company, Ltd., Toronto

(An address before the Toronto Chapter, February 9)

WE are returning to-night to a subject which has received considerable discussion in the past by Toronto Chapter, and to one which we all know that in whatever manner presented, will at all times arouse interest, and will finish the evening with many differences of opinion.

I feel safe in stating that there is no other one element in manufacturing costs that has a greater bearing on the ultimate profits, than a proper understanding—a correct application of the various items which are combined to represent that portion of our Factory cost which is known as Factory Overhead or Burden. If these items are not treated in a scientific manner their application may result in an ultimate loss which may have a direct bearing on profits through selling prices being set too low, or, by Overheads being included at a figure which makes the price of your manufactured article out of proportion to its real value and through this, cause a very direct loss of business.

As the subject of the paper to-night is "Overheads and Their Distribution," it might be well at this time, to give a definition in a broad sense of its meaning. Overhead is that portion of Factory Expense, both material and labor, which cannot be charged directly to the product manufactured, in the same manner as the direct material going into the production of the article, or the direct labor actually expended in its production. There are, of course, exceptions to this interpretation which may be amply illustrated by some industry where the packing or containers represent a very large portion of the cost, in some cases, as much in value as the goods they contain. In this instance, they would be taken as a direct material charge even although they represented no portion of your manufactured article.

In some departments of our plant not only the container but the shipping cover is a charge against the production of

the article, while, in other departments the shipping container is a charge against general overhead in shipping room expense. Inspection may also in some cases be treated as productive. The above, I feel, is a fair conception of the meaning of overhead, and common sense must be used by the person whose duty it is to handle the Cost System in the plant in which he is connected to see that any extraordinary condition in their process is treated in a logical manner.

In developing your Overhead System, great care should be taken to arrange a card of accounts that will reflect all important items of Factory Expense and the explanation of these accounts should be so clearly stated that there will be no doubt in the mind of the person, may he be in the office or in the factory, as to the nature of the expenses involved, so that the charge may be made to the proper account. The arrangement of your accounts should be such that your Expense Statements will show clearly the actual controllable expense of the department entirely separate from all plant general expense. Classified along these lines, expenses can be controlled at their source and departments checked up periodically, and items of an extraordinary nature forcibly brought to the attention of the department interested.

As well as showing the above divisions, it should also show uncontrollable expenses. These are items which are always with us and remain almost constant, irrespective of the volume of business. If you know what portion of your overhead this represents in your total overhead, the management may find it to their advantage at times, to take some business which will show very little if any profit, as in doing this their final showing will be improved to the extent by which this business helps to absorb some portion of this uncontrollable expense. If this information is not available, business might be refused at a time when it would be to the advantage of the manufacturer to accept it.

The expense of a plant consists of the following:

Repairs and Replacements

Your division of this account should be the same as your General Ledger Permanent Investment Accounts, that is, if you have an account in the General Ledger for Buildings, then in your Factory Expense you should have an account for Repairs to Buildings.

The following list gives a fair conception of these divisions, but should be modified or extended to suit the requirements of the individual Plant.

Land Improvements: Buildings, Pipe Lines, Fire Protection, Machinery, Vulcanizers, Equipment, Moulds and Forms, Tools, Furniture and Fixtures, Patterns, Trucks and Cars, Power Plant (steam and heat), Power Plant (electrical).

Non-productive, consists of: — Foremen's Salaries; Clerks' Salaries; Storekeepers' Salaries; Receivers' Salaries; Shippers' Salaries; Watchmen's Salaries; Allowance and Lost time; Unclassified Factory Labor; Difference in Pay Roll; Instructors and Inspectors; Sweeping and Cleaning; Packing Material and Supplies; Oiling and Belt Lacing; Defective work; Labor on work requiring special operation; Experimental expense; Factory Truck Account; Factory Stationery; General Labor and Supplies.

General Expense, consists of:—Power Plant Expense; Fire Insurance; Boiler Insurance; Car and Truck Insurance; Water; Taxes; Group Insurance; Workmen's Compensation; Depreciation; Office Salaries chargeable to Factory.

The Accounts listed above, will, I think, cover most of the expenses incurred in manufacturing. Headings and description of course should be changed to comply with the nature of the business to which the expenses apply.

As a means of identification, each Department of the Plant is allotted a Department number. Your expense accounts should also be numbered to take care of the classification set-up.

I will not discuss the use of tabulating machines to collect the information to arrive at your monthly final figures. We all are more or less familiar with the principle of their operation, but individual investigation must be made to decide whether the expense incurred in their use for this purpose would be warranted.

Assuming that ordinary office equipment and clerks will handle this work, the following two methods may be used.

Method (1)

Monthly expense ledgers, one for labor and the other for material should be operated. The index of these ledgers will be the account numbers by Departments, and from the daily time sheets and requisitions, all items of expense will

be posted as received. If desired, this work could be handled by one ledger, the sheet being designed to take care of both labor and material. The size of the Plant however, and the number of employees will suggest the best combination to use. Totals from these ledgers will be taken monthly and incorporated in your Overhead.

Method (2)

If the Plant is operated with a system of individual time-tickets against order numbers and operations, a filing cabinet may be indexed by account numbers and Departments and after the time-tickets have been dealt with, all expense account tickets may be segregated and filed behind their correct index. These are left to accumulate until the end of the Accounting period. They may then be added and the totals included in your Factory Overhead. Material requisitions may be treated in the same manner.

The information shown in the Expense Ledgers or filing cabinets is transferred monthly to a large expense distribution sheet or journalized to ledger accounts. I will however, from this point follow through on the supposition that the distribution sheet will be the medium used.

The account numbers are carried on this sheet vertically, while the Department numbers are shown horizontally across the top. The numbers of the Productive Departments are first shown on the sheet and the Non-Productive Departments are entered to the right of these. The direct material and labor, as shown in the expense ledgers, is posted to its respective Department by account numbers. The remaining charges of Non-Productive Departments, after all possible direct charges have been made to Productive Departments, are apportioned to the Productive Departments in the following manner.

Expense Repairs and Non-Productive of Non-Producing Departments

These are apportioned on the Productive Departments on the basis of relative value to Productive Department Pay rolls.

Steam Air and Heat

This includes wages of engineers and firemen, coal and other supplies used, also repairs and replacements to engines and boilers and are apportioned as follows:

Steam on steam used.
Heat on demand.
Air on air used.

If flow meters are not used, a schedule for this must be prepared from information secured from the Engineering Department, also of course, taking into consideration at all times any extraordinary condition which may exist.

Light and Power

With the exception of direct charges to the Department for items of expense incurred in the Department such as repairs to motors, etc., this includes all charges for purchased power as well as repairs and maintenance on all electrical equipment and is apportioned as follows:

Light—current demand according to candle power of lights.

Power—current demand according to motors.

Office Salaries

Includes all salaries chargeable to the Factory and paid on other than the Factory Pay Roll. These may include a portion of the Executives Salaries, Factory Manager's Department, Engineering Department, Laboratory, Order Department, Shipping Room, Purchasing and Cost Departments. These are apportioned to the Productive Departments on the basis of relative value of Productive Department Pay Rolls.

In the system with which I am dealing, no charge for interest is included in our Factory Overhead, and as this is still a very much debated point, both by Cost Accountants and others, let us pass on to-night without disturbing it. You will also note that in several of the accounts I am making apportionments direct to Productive Departments instead of apportioning first to Productive and Non-Productive Departments and then in turn apportioning the resultant figures in the Non-Productive Departments to the Productive Departments. This method may be open to considerable criticism, but from my experience, I can see no real advantage in making this other than direct to the Producing Departments.

At the first of the year an estimate is made on General Expense items, consisting of Fire Insurance, Boiler Insurance, Car and Truck Insurance, Water, Taxes, Group Insur-

ance, Workmen's Compensation, which fall due periodically during the year, and would inflate certain months if charged in these months. These estimates are made as close as possible and one-twelfth of the amount is charged to your expense monthly and credited to Reserve for General Expense. Any difference upon payment of the account is taken care of by adjustment. All of the above are apportioned on the following basis:

Fire Insurance (Department Values).
Boiler Insurance (Steam Demand).
Car and Truck Insurance (Relative Pay Roll Value).
Water (on Consumption).
Taxes (Land according to floor space. Buildings according to value.)
Group Insurance (Relative Pay Roll Value.)

Depreciation

This is figured at certain rates which have been approved by the Management. With us, these rates are taken against appraisal values or actual costs, and are applied from year to year against these values, or the Depreciation on a given piece of Property remains constant. We start off with the investment in each Department at the beginning of the year and depreciate by accounts according to our schedule of rates. The resultant Depreciation is divided by twelve, thus setting up the depreciation for the Department. Additions during the year are entered according to the Department in which the addition is made. These additions are depreciated monthly and added to the original set-up and included in the total Depreciation for the Department. All direct depreciation of the Department is charged direct to the productive Department, while the Depreciation of non-productive Departments is apportioned according to value of productive department pay rolls.

Other methods or plans of apportionment may be used. These may be the value of output or the poundage of the Department, but I find that productive pay roll, in this industry is a fair gauge with which to measure the cost of service from Non-Productive Departments.

After all of these apportionments have been applied and the necessary entries made to the Productive Departments, the expense of each Department is entered on individual sheets. These are entered to show first the Departmental

expense by months, and second the Department accumulative expense to date. This is the basis used for checking Overhead Rates, compiling Monthly Expense Statements and preparing comparative charts.

At this point, I wish to suggest to the Cost Accountant, for his very earnest consideration, the valuable use which can be made of charts, to bring to the attention of the Management the cost of service rendered by various Departments and divisions to the Factory as a whole in the final production of manufactured goods. Total production can be reduced to some common unit may it be pounds, yards, or pieces, and charts compiled which will show the cost of these services per unit of production, compared with a standard which has been set or with previous years.

Suggested items are:—Coal Cost, Coal Consumed, Boiler and Engine Room Cost, Water Consumption, Electrical Power Cost, Electrical Power Consumption, Stock Room Cost, Shipping Room Cost, Receiving Department Cost, Trucking Cost, Laboratory Cost, Repairs and Replacement Cost (Not Power), Power Repair Cost (Not including Electrical), Electrical Repair Cost, Labor Cost of Mechanical Departments.

In addition to these, general charts can be made for the Factory as a whole, on:—Total Pay Roll Cost, Productive Labor Cost, Expense Labor Cost, Overhead Cost.

This same method can be carried through Departmentally. I cannot stress this point too strongly, as Management is very easily educated to look for this charted information rather than delve through cumbersome statements to secure it.

You will also notice that I am taking Shipping Room and Stock Room cost in as Factory Expense. Some will argue that Factory cost ends with the delivery of finished goods to the finished stock room, but physical conditions in some Plants make it necessary to consider everything to the Shipping Room door as Factory Expense.

After all Overhead has been accumulated and properly allocated to all Productive Departments, consideration may be given to the best method of applying this to the cost of your product so that all goods manufactured shall be charged with their fair share of this expense.

Several well-known methods are used with varying degrees of success, and while most of these accomplish the

result desired, which is the distribution of expense against the product, still most of the methods used are generally open to criticism. The following are several of these methods at present in use.

Percentage on Prime Cost.
Percentage on Productive Labor.
Productive Hour Rate.
Machine Hour Rate.
Rate per unit of product.

Percentage on Prime Cost

Where the production is uniform and passes through practically the same process, and where the materials and labor show little, if any, variation in value this method may be used. The only reason that may commend this method to anyone is its easy operation, as the cost of raw materials used in manufacturing should have no influence on the overhead rates.

Percentage on Productive Labor

This is arrived at by dividing the productive labor of the Department into the total Departmental Expense. The resultant percentage is then applied on the production labor of all goods going through that Department. Where all the product of the Department goes through the same process, this method may be used with success. Where, however, operators are paid at varying rates and goods are processed by different machines, this method has its disadvantage. A low-price operator may use a valuable machine, while a high-price mechanic may be working on the bench, and his labor will be burdened with the larger amount under this method.

Productive Hour Rate

The total productive hours of the Department are divided into the expense and the resultant hourly rate is applied against jobs on the basis of the productive hours in the cost. This means that irrespective of wage rates every operator carries the same burden. This method also has the same disadvantage as drawn to your attention in the previous one.

Machine Hour Rates

To overcome some of the difficulties appearing in the previous methods, these rates were developed. Under this method a further analysis of your Overhead is necessary.

All expenses in connection with a machine or a group of machines of the same style are accumulated. This expense consists of Floor Space occupied, Depreciation, Repairs and Replacements, their portion of fixed charges, also small supplies used and, etc. This information is applied against the normal operating hours to arrive at a machine hour rate. This is applied in the cost against the operating time of the machine. The balance of the Department expense being, supervision, general labor, etc., can be applied on the basis of either of the two previous methods.

A more recent development in some of the larger plants is the application of Overhead to Burden centres. This consists of carrying the Departmental idea to a point where each group of machines of the same class or a body of workmen on any operation are considered as a Department within themselves, and burden rates are arrived at for each individual group.

Rate Per Unit of Product

Another method employed in some Plants where the nature of the product is the same is on the unit of production. The total units are divided into the total Overhead to arrive at an Overhead rate per unit, An illustration of this is a Cement Plant or a Brickyard.

In using any of the methods mentioned, it is not common practice to use the rates arrived at as shown by the monthly results as this would have a tendency to show wide fluctuations from month to month through production not remaining constant. In practice rates are set on anticipated normal production and costs are figured at these rates. If, when setting the rates a careful study is made of past results and present existing and any extraordinary future conditions, these rates in most cases will be so nearly correct that they may be used for six months or a year.

The difference between the actual expense and that absorbed in your costs by the rates used is carried as an over or under absorbed expense. If over absorbed this is taken as a credit to your sales cost, or, if under absorbed then as a debit. Thus making your operations reflect the true results for the period.

I am sure you will pardon me if I have omitted some important points which should be mentioned, as I have tried to cover everything as it occurred to me.

The Operation of a Modern Cost System

By L. RHODES
Consolidated Lithographing and Manufacturing Company, Ltd., Montreal

(An address before the Montreal Chapter, December 10)

PART II.

IN my previous paper I dwelt on those subjects which comprise the primary and fundamental elements of cost; items with which a junior Cost Accountant should be thoroughly acquainted, both as to their meaning and applications in costs, before he can begin to search into the actual workings of a cost system.

It is a truism that we must first learn to walk before we are able to run.

During the course of this paper I will make an attempt to illustrate how the cogs of a cost system actually work so far as it concerns our particular business. It must be borne in mind, of course, that being more familiar with the lithographing industry than any other, I shall naturally confine my remarks to the system and methods as adopted and used by this industry, but I have no doubt that a few of you, at any rate, may find some of the methods we use helpful, and which with modifications or improvements to suit your individual line of business, might with advantage be employed in your own Cost Systems.

Before going into the actual detail of describing how the time of departments is collected and compiled, I just want to dwell for a few moments on a few small, but nevertheless important details, which I would like to be thoroughly understood, particularly by the junior members.

The first is this, that in the Lithographing Industry (as in many other industries), the unit employed in determining the cost of manufacture is that of the Productive Hour, sometimes called the Sold or Chargeable Hour.

As I explained at the last meeting, where hand labour is the producing factor, the productive man hour is the unit used, and in the case of a machine, the productive machine hour is used. When considering the relationship between the time spent on *actual* production, and that which is

known as the possible productive time, the fundamenal difference between the productive man hour and productive machine hour should be taken into consideration.

In the case of hand labour, the percentage of productive time is that ratio of the actual producing hours to the sum, of the productive and non-productive man hours paid for.

To explain my point: We will take forty-eight hours a week as being the total possible time one man could work on production, or better still, forty-eight hours are the total hours for which a man is being paid, during the time he spends in the factory. If he only works twenty-four hours on actual production, the ratio of twenty-four to forty-eight is taken as the percentage of productive time to possible time. Bear in mind this, however, that although a hand-work department may be amply provided with equipment to employ fifty men on production, only the time of those *actually* employed in the department is computed, even thought there may be only two men. Any other basis would prove to be incorrect and misleading.

In determining the relationship of the percentage of productive machine hours to that of possible machine hours the procedure differs somewhat. This is arrived at by comparing the total actual producing, chargeable or sold hours (whatever you wish to call them), to the total possible machine hours, the latter being based on the full operating time. For instance: If there are thirty machines in operation, and the department is working eight hours a day, there will be a total of 240 possible machine hours (30 x 8). Four factors enter into this latter item, the time spent in make ready, actual running hours, non-chargeable time and idle time—the first two items, with the exception of a few isolated cases of make-ready, being chargeable time.

It may be well to point out here that the percentage of productive time does not always reflect the efficiency of a department. It happens occasionally that a department shows a highly satisfactory percentage of productive time, but if further analysis were made we might discover that the second half of a period was spent in re-producing an article which was spoiled in the process of manufacture during the first part of the period, so that where twenty-four hours, say, were charged for, possibly forty-eight hours were expended on its manufacture. I can imagine some enterprising junior turning over in his mind that this is

where the Reserve for Spoilage asserts itself—of course it is a consolation sometimes to know that there is Reserve for Spoilage, but in order to keep in business nowadays it is necessary occasionally to charge a job to a customer, and to be charging jobs to Spoilage Allowance too frequently, is like pulling the plug out of a boat to let the water out.

Now that I have made clear I hope the basic difference between the chargeable man hour and the chargeable machine hour, I will now go ahead and explain various items of routine.

You have in front of you samples* of the Daily Time Ticket which we use in our plant. No doubt some of you will be struck by its simplicity in composition. Unlike many Time Tickets which I have seen—some of which resemble an Army Attestation Form than a Time Ticket—the instructions printed on this particular ticket are straightforward, and to the point, there can be no doubt even to the lowliest of employees, as to what information is required. In my opinion this sober looking Time Ticket is the most important piece of paper in the whole Cost System. It is the very keynote and basis on which the workings of a Cost System are made to function.

It is in the proper recording, and the filling in of correct data, that decides whether we shall ultimately make a profit or loss on sales.

It supplies the detail whereby we can arrive at the cost per chargeable hour by departments. It also supplies the data whereby we are able to determine the productiveness of the various departments—therefore the very fact of its tremendous importance naturally suggests to the Cost Accountant that its composition should be such as to enable the individual workman making up a correct and complete report of his activities in as simple and concise a manner as possible. From my own experience I have found that it is sometimes a difficult matter to make the workman himself realize the importance of this particular source of information. At intervals a workman knows that he has spent more chargeable time on the production of a job than is actually required, and consequently he may have a desire to take off a portion of this excess time and distribute it over some non-chargeable operations which may give the

*Space does not permit of the reproduction of the forms with which Mr. Black accompanied his address.

appearance of toning down the actual productive or chargeable time.

This padding or trimming of Time Sheets is a most serious matter, in that it tends to set up a false standard of time required to produce a job. For instance, if a workman shows less chargeable time than it actually takes to produce a certain order, it is obvious that the firm is losing money, not only on that individual order, but possibly may be the loser on any subsequent order, if this standard of time is taken as a criterion for estimating.

On the other hand, should the practice of "padding" the chargeable hours expended on production prevail, there is no surer way of diverting orders to competitors, owing to the firm's inability to compete because of the seemingly greater length of time taken to produce.

It is well worth the time and trouble for a Cost Accountant to apprise the foreman of a department—when cases of a similar nature to the ones I have described are suspected—that both the practice of trimming and padding Time Sheets eventually reflects on him, inasmuch as the former would ultimately show a detrimental percentage of productive time to possible time, and in the latter case would in the end prove derogatory as to the value and efficiency of his workmen.

The importance of the preceding remarks cannot be too strongly emphasized on the Cost Accountant. It is not enough to merely check up the chargeable time alone on the Time Ticket, and then allow the non-chargeable time to take care of itself. To do so is to ignore one of the first principles of cost accounting. Each and every factor must be taken into consideration if a cost system is to be developed into any degree of usefulness.

I hardly think it is necessary to describe how the Time Ticket is filled in by the workman, as the headings thereon are self explanatory, and there is no subject so dry and uninteresting as the recital of a mass of routine data. The only thing which requires any comment is the column designated "Kind of Work." The information required in this column is represented by an operation or code number. These numbers until quite recently were enumerated on the reverse side of the Time Sheets. Now let us follow the system step by step.

The first piece of routine undertaken after the Time Sheets are collected is that of checking up the time worked against that represented by the time punched on the Time Clock Slips. This is naturally the first thing to attend to, as it may be found occasionally that some workman performs chargeable time in spirit, although not represented at the plant physically. This operation completed the chargeable and non-chargeable time is segregated as shown by the Column designated "For Office Use," and the chargeable time then distributed to the various Individual Job Records (Form B). As the title of the form implies, an Individual Job Record is made for every Order that goes through the plant. The whole of the particulars as shown on the Daily Time Ticket which are applicable to the jobs concerned are in turn recorded here.

This Job Record contains an accumulation of all the time expended, also a record of all materials used during the process of manufacture. It serves also the purpose of a Job Tracer, as it is possible to ascertain at a glance which department was working on the order at any particular date.

On completion of an order, the total time expended is summarised by departments, recapitulated and extended at the standard rate set up for each productive centre. It is well to remember that the hours as charged on the Job Record do *not* constitute the actual cost, as I explained in my previous paper. This Standard Hour Rate is a fair price based on an average all inclusive cost, which includes wages, all Overhead Expense, General Commercial, Stock, Storage and Handling, Shipping and Selling Expenses, spread over a period sufficiently long to cover varying conditions.

To complete the Report, the total amount of Paper, Ink, Outside Work, Engravings and Bindery materials used are extended and changed into the cost of manufacture.

The amount of information that can be had from this Job Report is surprising, particularly when a repeat order, or an order of a similar nature comes to hand. Quite often it is a means of making an improvement in the planning of the order's progress through the plant, which would dispense with a considerable amount of non-chargeable time—therefore, apart from the actual data which is supplied for the specific job for which it was made out, this form contains information which for future reference has a potential cash value.

On the completion of each order, the summaries as shown on the Individual Job Report are recapitulated on a monthly completed Work Sheet. From this we can ascertain the total amount of Stock, Ink and Material used, the set up value of labour expended in production, also the Selling Price and Profit or Loss on each and every job that was completed during the month.

Now we will touch briefly on the two next items of routine which are entailed by the process of segregating to the proper sections the data as recorded on the Time Ticket. As you will notice on Form "C," the "Monthly Record of Machine Department," the record of Make-ready, Running, Non-chargeable and Idle Time, together with the amount of output is recorded daily. We have also a form similar in composition for the Handwork Department on which we also record the amount of chargeable and non-chargeable time.

A copy is made of the information as contained in the two previous forms, and forwarded to the executives of the company, in the shape of a Daily Production Report (Form D), which shows by Departments the previous day's time spent by each productive centre.

This is a most useful report as it illustrates at a glance, the daily efficiency of each individual machine or operation. From an analysis of this information can be gathered whether or not the make-ready time was excessive, or perhaps the non-chargeable time was out of all proportion, occasioned no doubt by a press having to wait for stock, or probably awaiting some individual's 'O.K."

Many instances similar to the ones I have quoted can often be discovered by a careful scrutiny of this Report, which, were they brought to the attention of the plant superintendent would be promptly remedied.

We now come to the final, yet not least important phase of collecting the particulars as recorded on the Time Ticket, that of entering on the Pay Roll (Form E) the total time expended by a workman in any department he may have been engaged in during the day.

The accurate filling in of the Pay Roll, I believe, has more to do with the accuracy of the Cost System than any other item of Expense.

When any analysis of costs is undertaken, this item of Pay Roll invariably comes in for a considerable amount

of scrutiny, and rightly so, because in our line of business this item of expense resolves itself into about forty per cent. of the cost of manufacture (exclusive of materials of course), and averages about twenty-five per cent. of sales—therefore, it becomes obvious that a great amount of vigilance and care is necessary in the compiling and distribution of Pay Roll costs, and that each department or cost centre, is charged with the proper amount of wages it incurs, according to the amount of time expended by each workman in each department's particular sphere of activity.

You will notice on the form before you, that a section of 31 days is devoted to each department in which it is possible for a workman to be engaged in, giving a total of 48 departments, inclusive of General Transfer, Litho. and Type Press, Bindery and Carton Departments, Stock Handling and Factory Expenses.

The departments enumerated on this Pay Roll are only those applicable to the Lithographing end of our business. We have another Pay Roll Form for our Card and Paper Department, which comprises a further addition of 30 other Departments.

A Pay Roll Form is made out each month for every individual workman engaged in the plant, the time as shown on his time ticket (both chargeable and non-chargeable), is segregated to the various departments he has been engaged in, so that each centre is charged the amount of wages the workman was paid, during the period he was employed therein. At the end of the month, the total hours worked are extended at the hourly rate paid, and the results as shown on each Individual Pay Roll are recapitulated by departments, each department is apportioned its proper share of general work, such as General Transfer Lithographing, Type and Carton, the result being the total amount of wages incurred by each Department for the month.

This Pay Roll I may mention is not used by the General Office for computing the amount of wages to be paid to the man, its composition was devised purely for costing purposes only, however, the amount of wages paid, reconcile with the amount of wages as charged to the various departments.

The foregoing remarks constitute the procedure to be taken before the Time Tickets can be dispensed with and filed, of course the explanation of each item of routine

could have been made in quite a few words, but my idea was to kill two birds with one stone—to explain the order of routine pertaining to each form first of all, and then, make a description of the "why and the wherefore" of the functions for which the forms were originally designed. You will readily see then, that the humble looking time ticket is after all the most important of any form in the entire system of Cost Accounting. Everything is dependent on it. A firm may have the most up-to-date and fool-proof system of Cost Accounting it is possible to possess, but if the Time Tickets are being continually filled up with information, which does not represent actual facts, then the whole system is worse than useless.

Now that I have given you an idea of how we collect, and distribute the various items of time and other data which is contained in the Time Sheets, I will endeavor to give you a brief outline of how we compile this information into some tangible form, whereby we are enabled to formulate some idea of the efficiency and productivity of the plant.

We have a form known as the "Summary of Department Costs," usually called the G.H.

On this form is distributed the whole of the Fixed Expenses which are necessary and applicable to the various processes of manufacture. You will notice from the exhibit that provision is made for all departments—one column for each.

Plant Investment is made according to amount of plant and equipment used by each individual department.

Rent and Heat, Insurance, Taxes and Depreciation are shown by departments.

Pay Roll is distributed over each productive centre, according to the amount of wages incurred by each during the month's activities.

Light is distributed on the basis of candle power used.

Power is charged and distributed according to the consumption by each department.

Spoilage is charged into General Factory Expense.

Direct Supplies and Expense is charged and distributed to Departments, according to the amount each incurs, any expense which cannot be allotted to any particular department is charged into General Factory Expense.

Packing, Shipping and Delivery Charges are taken care of in column 5.

Superintendent's Salary to General Factory Expense column.

General Administrative Expenses as shown are taken care of in column 1.

Selling Expenses are dealt with in column 2.

On line 37 the expenses are totalled up giving the amount of Direct Expense incurred by each Department.

You will notice on line 30 that we make a division of the total General Administrative Expenses to Selling, General Factory and General Commercial Expense.

On line 31 the total General Factory Expense is made, which includes also the share of General Administrative Expense, and is distributed over departments according to the amount of Direct Expenses incurred—of course it will be readily seen, that this method of distribution is not the perfect way of distributing General Factory Expense—that method is yet to be discovered—but our way is the one adopted by the Lithographers and Printers Associations, until a better method can be determined.

The distribution of General Commercial Expense (line 33), is made in much the same manner as General Factory Expense, only the total of Department Direct Expenses plus each department's share of General Factory Expense is used.

For the purpose of arriving at an all-inclusive cost per chargeable hour (from the average of which, we base our Standard Hour Cost), we take the total amounts of selling (A), Stock Handling (B) and Shipping (C), and distribute them according to the Total Departmental costs, which includes the Departmental Direct Costs—plus each Department's portion of General Factory Expense and General Commercial Expense.

The remainder of the items enumerated on the G.H. Form, hardly need any describing, the headings are self explanatory.

I would now like to point out a few of the uses, to which we are able to employ this monthly Summary of Costs.

First of all, if we are to make proper use of it, we must make comparisons with the figures of previous months,

merely to know that the production of a press reached a certain number of impressions this month, or that some department's chargeable time was a certain percentage of possible time is not enough, it is only when intelligent comparisons are made with some previous standard or results, that the true value of the information contained in this summary can be fully appreciated.

Its study reflects whether monthly costs are above or below the average, whether Productive Time is normal, or whether the quantity of output of any individual department reaches the average—these examples are only a few of the numerous uses, to which a periodical study can be applied with great advantage. This, gentlemen, almost completes my second paper on "The Operation of a Modern Cost System." As is necessitated in a paper of this description, a large amount of routine data is unavoidable, but during its composition I have tried to keep uppermost in my mind, that a certain amount of variety is needed—without losing the logical sequence and order of the system—if the undivided attention of the members is to be prevented from flagging, and if I have succeeded in keeping you interested, I feel more than recompensed for the time spent in its preparation.

Costing Life Insurance

By J. H. LITHGOW

Actuary, Manufacturers' Life Insurance Company, Toronto

(Before the Toronto Chapter, February 23)

IT is generally recognized that the business of life insurance is one with many sides to it, some of which are of a very technical nature. To attempt to cover any one side of it thoroughly in the time available this evening would be, not only impossible, but would be an unwarranted strain on your good nature and patience. I shall endeavour, therefore, to avoid the discussion of technical matters and shall attempt to deal only with certain of the principal features of the business, and with those in a necessarily somewhat general way.

Before doing so I think you will be interested in hearing the following figures which give some idea of the extent of the life insurance business in Canada.

1. The beneficiaries of the holders of life insurance in Canada are now protected by policies which amount to the sum of $4,500,000,000.
2. The holders of these policies paid in premiums in 1926 the sum of $160,000,000.
3. The assets held by the companies in respect to this business amount to $1,250,000,000.
4. The percentages of this business applicable to Canadian companies, British companies and foreign companies (almost entirely U.S.A.) are approximately 67½%, 2½% and 30% respectively.

In addition there are certain of our Canadian companies which are operating extensively outside of Canada. A number of the Canadian companies operate in the United States, the West Indies and Central and South America, four are operating in Great Britain and two in South Africa, Egypt, India, the Straits Settlements, China and Japan. Certain of these companies have been operating in a manner of these foreign fields for over twenty-five years. The reputation of the Canadian companies in these countries is of the highest and their honourable records have, in the opinion of those

qualified to speak, been of no little assistance to Canadian foreign trade generally.

The Determining of Rates of Premium

This is one of the principal problems which the actuaries of companies have to face. It is of a particularly technical nature and it will probably serve if I merely outline the fundamentals of the problem.

The simplest form which a life insurance policy can take is a One Year Term Policy, under which the person insured pays one premium and the company agrees to pay the sum insured under the policy to the beneficiary in the event of the person insured dying within the ensuing twelve months.

To determine the premium which should be charged per unit of sum insured, the companies first have reference to what is known as mortality tables. These tables have been prepared from the combined experience of the companies covering a sufficient number of lives to permit reliable conclusions. They show at each age the probability of dying during the following year. Let us suppose that at age 35, for example, this probability (which is called the rate of mortality) is .005, or in other words, out of 1,000 persons aged 35, 5 will, on the average, die within the next twelve months. If then we are going to pay $1,000 to the beneficiary of each of the 5 persons dying we would require each of the 1,000 insured to pay a premium of $5.00 at the beginning of the year, assuming for the moment that there is no such thing, as interest or discount, and that the entire transaction could be carried out without expense or profit.

Considering, however, that the premiums paid will be invested and earn interest up to the time the money is required to pay the claims,we see that the company can afford to accept a premium slightly smaller than the $5.00 mentioned, depending on the rate of interest which it can earn.

This smaller amount is what is known as the net premium and from it the gross premium, which is charged the person insured, is obtained by making an addition to cover all the expenses commencing with the cost of selling the insured the policy and ending when the amount of the policy is paid the beneficiary.

The foregoing illustrates the general principles which are followed in the calculation of premium rates, although

the calculation for policies running for a longer term and involving more complicated benefits are naturally more intricate.

There is one feature of policies which run for more than one year which, in view of its important effect upon the business and the companies, calls for some explanation.

The probability of dying or the rate of mortality naturally increases with the increase in age and consequently a person taking out a policy covering the whole of his life would each year pay an increasing premium to cover the increasing risk.

This is not unsound in theory, but in practice it is found that the person insured desires to pay a premium which is level each year. As a result the insured pays in the early years a premium larger than that necessary to cover the current risk and in the later years a premium less than that required. Consequently, the company must set aside this excess premium from the early years and accumulate it in order to help meet the claims as they fall in later on. It is this that results in the life companies having such large accumulations of assets which must be carefully invested and against which an actuarial liability, known as policy reserves, appears in their balance sheets.

In view of the fact that policies may run for many years from the time they are taken out, the assumptions made in the calculation of premiums as to the rates of mortality, interest and expense which will be experienced in the future must be on a very conservative basis.

Costing Life Insurance

When we come to determine and analyse the cost of life insurance we at once have to consider what life insurance really is. We find that there is no raw material and no cost of manufacture, such as there is with other commodities. Instead we find that a life insurance policy is merely a promise on the part of the company to pay a certain sum of money in the event of a certain contingency arising, usually the death of the person insured. In consideration of this promise the insured agrees to make certain stipulated premium payments.

Before proceeding further we must give some attention to the principles underlying the two forms of insurance,

which are issued, namely, the nonparticipating or without profit system, and the participating or with profit system.

As was mentioned in dealing with the determining of premium rates the assumptions made concerning the various factors which enter into their calculation are made on a conservative basis, with the result that a slightly higher rate of premium than is necessary is charged and a profit to the company results. This profit arising from policies issued under the nonparticipating system belongs entirely to the shareholders of the company who would, on the other hand, have to bear any loss which might occur. The nonparticipating system is the one on which forms of insurance other than life insurance are done and was the one upon which life insurance policies were first issued.

Owing, however, to the fact that the thrift or savings idea is closely associated in the mind of the public with the idea of life insurance, and to the natural desire which we all have for profit, the participating system grew up. Under this plan the insured pays a premium slightly higher than that charged on the nonparticipating plan and in return the company agrees to pay to the insured a proportion of the profits earned. The proportion which the insured receives in Canada is regulated by the Dominion Insurance Act whereby the insured must receive at least 90%, the balance, of course, going to the shareholder. A number of the companies have, however, voluntarily increased the policyholders' proportion in some cases up to as high as 95%, and it is not unreasonable to expect that this percentage may be still further increased.

We therefore must keep in mind that the premiums which are received by the company must cover both in the case of participating and nonparticipating insurance the following:—

1. The net cost of the actual payments which the company under its policies promises to pay the beneficiary or the insured.
2. The expense involved in selling the business.
3. The administration expense involved during the whole course of the policy.
4. The margin of profit available for shareholders, or policyholders and shareholders.

While these items are most thoroughly analyzed in the Head Offices of the companies I do not intend to weary you

with the details of how it is done, but will comment briefly on them.

Dealing with them separately and in order, it may be pointed out that the net cost of

1. i.e. the actual payments depends upon the actual rates of mortality and interest which the company experiences.

In regard to the rate of mortality: I may say that it has been steadily improving for some years now due to advances in medical science and public health work, particularly at the younger and middle ages of life. This improvement has, of course, resulted in a reduction in the cost of insurance. While it is true that a company can to some extent control its mortality by stringently selecting its risks it would soon hear from its agents and competition pretty much compels the companies to maintain about the same standards of selection.

In so far as the rate of interest is concerned, as previously mentioned, the first consideration is safety of principal and the second to obtain as high a yield as possible consistent with the first. Between the company which, for example, invested all its funds in government bonds and the one which held only, say preferred stocks, a considerable difference in their respective rates of interest earned would exist. The latter would obviously be higher, although allowance would have to be made for the larger losses which the latter would experience, and the slightly higher rate of investment expense, which it would have. As a matter of fact the investments of the different companies are distributed in pretty much the same proportions among the various classes of securities.

In any event the rate earned has always exceeded that assumed in the premium calculations. It should be remembered that in determining premium rates the company has to make assumptions as to what rate of interest it can safely count on earning over the succeeding fifty or one hundred years.

2. The next item is the sales cost. This consists of salaries and commissions to salesmen and training and supervision cost, and advertising, etc.

The usual method of paying the salesman is to allow him a substantial rate of commission on the first year's pre-

mium and a comparatively small rate of commission on the subsequent nine or, in some cases fourteen, premiums, the salesman receiving approximately one-half of his total remuneration on the first premium. I do not think it can be said with any justification that the commissions which the life insurance companies pay their salesmen are exorbitant, or that they exceed the amounts necessary to attract the right type of men to the business. In common with other sales forces there will, of course, always be the exceptional man who will do extremely well.

The most up-to-date form of salesmen's contracts provide, in addition to the commissions allowed, other benefits such as retiring pensions, etc., all with a view to attracting to the business a good type of man and retaining him in the business. That the companies are meeting with some measure of success in this endeavour is, I think, evident in the type of men now representing them in the field.

3. The third item, the balance of the expenses are what we have termed administrative expenses and include such items as, Head Office and Branch Office salaries, rent, light, heat, printing and all the sundry expenses involved, medical fees, legal fees, and last, but not least, governmental taxes. The opportunity cannot be let pass of pointing out the injustice of a great many of the taxes which the life insurance companies are required to pay. Particularly so is the tax upon premiums which, in the final analysis, is a tax upon the thrifty wage earner of moderate means who carries life insurance, and who should be exempted from a tax on his income. The tax cost is a substantial part of the cost of life insurance.

4. Coming to the fourth item—the profit available for shareholders and policyholders—we see that it therefore depends entirely on the extent to which the actual mortality, interest and expense differs from that assumed in the calculations of the premiums. In so far as non-participating policies are concerned it must be considered as part of the cost of insurance. In the case of participating policies only that part of the profit which is retained by the shareholders can be considered as part of the cost, the part returned to the policyholder really constituting one of the benefits under the policy.

In either case it is extremely small and, as previouslv mentioned, it shows a tendency to decrease.

To summarize, the cost of life insurance may roughly be analyzed as follows:—

85% of the gross premiums paid to cover the net cost of the benefits granted including the profit.

7% of the gross premiums paid to cover the sales cost.

7% of the gross premiums paid to cover the administrative cost.

1% of the gross premiums paid to return to shareholders.

(It is of course the difference between the premiums actually paid and the amount thereof required to cover the first three items).

Some Modern Developments of Life Insurance

A paper of this nature would not be complete unless at least brief mention were made of some of the outstanding factors which have contributed to the remarkable growth of life insurance in recent years.

In a paper read before the Insurance Institute of Toronto in 1926 Mr. J. B. Mabon classified these factors under three headings.

1. those developing public confidence in, or creating a need for life insurance.
2. those whereby life insurance becomes available to a greater proportion of the population.
3. those making life insurance policies more attractive to the public.

Under the first heading we may mention the increased knowledge of the public as to the benefits and uses of life insurance. It is more and more being appreciated that life insurance not only is of value in the home as protection against the death of the wage earner, but that it fills an important need in business, for example:—

It affords at least partial protection against the death of important executives and technical men.

In partnerships it protects the business and the interests of the surviving partner and the deceased partners' estate.

It will provide a sinking fund for retirement of debt obligations and is of value as collateral for the securing of credit.

In the form of group insurance it promotes good will, reduces labour turnover and assists in taking care of employer's obligations to his employees.

Under this same heading may be mentioned the fact that the standard of living has improved and economic conditions have changed. The man who, with $5,000 of insurance years ago believed he was adequately protected now realizes that a much larger amount of insurance is necessary.

Under the second set of factors, namely, those whereby life insurance is being or has been made available to a greater proportion of the population, are included:—

Non-medical insurance under which policies for limited amounts are issued without the trouble or expense of medical examinations.

Payroll Deduction Insurance under which the payment of premiums is facilitated for those on moderate weekly or monthly salaries.

The development of sub-standard business whereby impaired risks formerly refused insurance are now being accepted by the companies.

Under the third set of factors, those making life insurance more attractive we find:—

The tendency on the part of the companies to simplify their policy contracts and to remove from them any unnecessary restrictions, as well as to include certain privileges formerly not granted.

The introduction of the Total Disability and Double Indemnity provisions whereby the losses from disability and accidental death are alleviated.

The introduction of income forms of policies and the inclusion of income provisions in regular policies providing for the payment of the proceeds of life insurance over a number of years instead of in a lump sum.

To these groups of factors, then, should be added another, I believe, and that is the fact that the companies have been actuated by high ideals and in the carrying out of those ideals have been served in both Head Office and in the Field.

In conclusion, I am going to quote a short paragraph which appears in the latest report of the Dominion Superintendent for Insurance, Mr. G. D. Finlayson, in which he refers to the life insurance business, as follows:—

"These gratifying results are no doubt in part due to the principle of stability and publicity enunciated at the beginning and adhered to ever since, but it must be admitted that they are in great part due to the fact that a realization on the part of the directors and officers of the companies of the magnitude of the interests and the sacredness of the trust committed to their care has induced a responsibility and standard of management which is probably not exceeded in any other business in this country. If this sense of responsibility and standard are maintained and if the interests of the insuring public remain paramount, the development of the business in the future is bound to be greater than anything that has gone before and the business will hold an increasingly important position among the financial and commercial interests of the country."

New Methods Increase Production

BY HENRY P. WHERRY

Vice-President and General Manager, Rossendale Reddaway Belting and Hose Company

(Reprinted from "Manufacturing Industries," published by The Ronald Press Company, New York).

FINANCING of manufacturing operations in any company naturally depends to a great extent upon the financing of sales activities. Few companies, even the small ones, now proceed with the making of articles until they examine their sales possibilities as a basis for manufacturing schedules. If the sales outlook is bright, the superintendent in charge of manufacturing will have little difficulty in persuading the treasurer to furnish him with funds to buy equipment and material to carry on production.

Manufacturing Budget

The manager's problems here are much simpler in coordinating the activities of the two departments, because the manufacturing department deals with concrete factors. Costs of labor and materials can be closely estimated. The

kind of equipment required and its price and maintenance costs are definitely known. The total funds required to carry on manufacturing operations to meet established sales schedules, can be very definitely calculated. A monthly budget of such expenses is very easily worked up. While the tendency of the manufacturing department is to set high figures on such estimates the financial department can usually have the values adjusted so that there is very little variation from the estimates in the manufacturing expenses as they actually work out.

The purchasing agent must be consulted in working up a financial program. While he may operate successfully on a budget, he increases the value of his department to the company if he has the opportunity to take advantage of unusually favorable markets when they develop. Generally, however, it is unsafe to gamble on semi-finished or finished products required in manufacturing operations. With actual raw materials, such as cotton, wool, ore, wheat, etc., the case is different. Buying such items in quantities on low markets is advantageous. These raw materials can usually be resold, often at a good profit, if the company's own manufacturing program is cut on account of stock business. Materials which have undergone processing and are bought in the partially finished state cannot be disposed of in most instances, and may lie idle for a long time, tying up money which should be available in the form of cash to tide over a period of stringency. The responsibility of the manager in the small plant is to become acquainted with the problems of the purchasing agent so that he can exercise discretionary judgment in cases where heavy demands are made upon the financial department for the purchase of materials.

The organizing and operating of adequate accounting and costs systems is one of the most necessary duties of the financial department. Without such systems, co-operation with the other departments is impossible. In the first place, sales and manufacturing activities cannot be successfully conducted in the present day of narrowed profit margins unless financial data on the operation of such departments is collected, compiled and analyzed. Adequate records show at once whether selling and manufacturing are on a profit-paying basis. They also enable the company to plan future programs intelligently. The information they convey enables the treasurer to do his part in correlating activities so

that the company is always able to maintain a sound financial status.

The manager of the small plant is called upon personally to check up on the operation of accounting methods. Unless he does so, the financial department usually will develop a too highly refined system, or else neglect to provide for some of the most useful records.

Cost Accounting Expense

The small company cannot afford to pay for the installation and operation of systems which yield the complete detailed information found necessary in a large organization. In plants of considerable size manufacturing operations are extensive, and small details cannot be neglected because the sums involved aggregate into large totals. But in the small company many such items require little attention. The object is to assemble correct information quickly enough to guide the affairs of the company safely and wisely. By the time refined details can be collected and analyzed in the accounting department of a small plant, the opportunity to use the information effectively usually has passed.

A cost system suited to the requirements of the particular business is so much of a necessity and in such common use that but little need be said about it. Reliable data on actual costs, and information upon which to base future cost estimates correctly, are all that is demanded. The cost system probably will be administered under the financial department, but it should co-ordinate its work as closely as possible with production. If the manager of the small company can secure his cost data promptly and knows it to be correct, he can safely omit some of the details of cost work which the complicated organization of the large company makes necessary.

Simplicity is Essential

Besides possessing simplicity, the cost department must operate at little expense. Only a few people can be employed. Forms must be few in number. Requisitions on the storeroom for materials, when filled, can be sent to the cost department and used to calculate the costs of such materials. Time tickets correctly designed furnish the basis not only for the payroll but also for labor cost calculations. Material and labor costs for repairs can be gathered on the same kind

of forms. Data on equipment and supplies issued from the storeroom are obtained in a similar way. Items purchased for special purposes and not going through the storeroom can be accounted for through a purchase ledger. Salaries, administrative expenses and other overhead items usually are entered directly on the books so that the cost department can use them readily.

With these data on hand, and a good cost clerk to compile them, the small plant has enough records to answer almost every cost purpose. Compilation, presentation and analysis of such figures in useful and understandable form is the basis for financial control of the enterprise. This task probably causes the plant manager of the small industry more trouble than any other single factor. The services of a statistician who is able to pick out the facts necessary, prepare them in the form of suitable tables or charts, and point out the significance of trends in the various departments, as well as for the business as a whole, would solve the difficulty. But a good, broad-gauge cost man who keeps abreast of modern practice usually can handle the analysis with beneficial results and should by all means be placed in a position to do so. Unfortunately, the high cost of engaging a statistician who is fully capable of analyzing the facts and trends correctly, places such a man beyond the reach of the small company, and few plant managers, who are possessed of the qualifications required for successful administration, have also the necessary outstanding statistical ability.

Other Duties of Financial Department

Among the other duties with which the financial department is charged are the ascertaining of gross profits on the various lines of product, finding out the most profitable products, handling credit and collections, and building up reserves for contingencies.

Gross profits can be calculated if the accounting system is adequate. Finding out the most profitable products is a longer process and requires assistance of the production and sales departments, especially when it comes to the useful application of this knowledge.

Credit and collection work must be carefully performed. Losses from bad debts running up into large sums of money affect the financial situation very quickly in a small

plant. Hence care must be exercised in the granting of credit, although unnecessarily strict provisions will turn away trade that will be seriously missed. Collections have to be followed up, but the small plant must exercise discretion and use special measures to preserve the good will of customers. Tactless pressure cuts off the chances of future orders. Customers are careful in their dealings with large corporations, but have little hesitancy in throwing over the company operating on a small scale.

The small plant is well fixed if it can build up ample reserves for contingencies. Bad debts, slow collections, obsolete materials on hand, unforeseen expenses in marketing products, unusual demands for experimental work, and periods during which the plant is on low production, are only a few of the many things which at times bring severe strains upon the finances. Funds which can be spared from sales and manufacturing activities and put aside for such purposes will often tide the company over some critical period. The small plant usually finds the demand upon its money from the operating departments so heavy that it cannot build up large reserve funds. But it should set something aside, however small. Otherwise these contingencies usually have to be met by a readjustment of sales or manufacturing schedules, or by borrowing from banks.

Solving Financial Problems

Financial problems of this character usually devolve upon the manager for solution, whereas the large plant probably has its finance committee to handle such situations and, because of its reputation and the prestige of its directors and executives, as well as its ability to keep losses from such sources comparatively small, weathers the storm with less difficulty.

On top of all these duties, responsibilities and problems which he shares with his assistants who are in charge of selling, manufacturing and financial operations the manager of the small plant has difficulties peculiar to his own office. He alone is responsible for the organization of the business into an effective profit-making enterprise. He must study out the correct functions of management in his company and must see that he fulfils these functions satisfactorily. His administrative task covers not only the co-ordination of sales, manufacturing and financial functions so that the

heads of the various departments co-operate with each other, but also involves the performance of much actual work himself. He may, in fact, head up any one or more of the departments and actively direct their affairs.

Upon the plant manager also rests ultimate responsibility for the success of the entire enterprise. He may be one of the executive officers and perhaps hold a place on the board of directors, or he may be engaged by the board as general manager. In any case he is held accountable by the board and by the stockholders for the carrying on of the business. Hence, when laying out any plans and putting them into execution, he must think not only of the operating side of the business but also of the reaction upon the board of directors and the stockholders.

In most cases the stockholders of a small company take a more personal interest in its affairs than do the majority of stockholders in a large corporation. The small company has comparatively few who are financially interested in it. These few may be business men or bankers, and may watch the affairs of the company very closely, perhaps even holding executive office. On the other hand, they may be merely investors who follow up the developments of the business only at the time of the annual meeting, and the executives themselves may place the whole responsibility upon the general manager and exercise no personal administration over the operation of the company. But whatever their activities, they are all interested in profits. The manager must adjust himself to whatever set of conditions he faces, and be in a position to lay facts before the officers periodically, or at any time they require.

Industrial, economic and social conditions have introduced new elements into business. Trade associations have been formed in a number of industries and their growth is certain to continue. The manager of the small plant must represent his company in the association and handle its relations with other plants in the same industry. Co-operative efforts may be undertaken and the manager must decide just how far he can participate in them with benefit to his own enterprise.

The co-ordination of activities is not limited to plants in the same industry. It may include several different industries particularly if they are in the same region. Apprenticeship training is one example of such mutual under-

takings. The small plant may profit more than a large one by such co-operation and it is the manager's job to measure the possibilities, lend whatever assistance is advisable, and secure the maximum benefit possible in each case.

Actual Application of Methods

Up to this point the discussion throughout the present and preceding articles has dealt in a general way with the differences in the problem of management between large and small companies. Particular attention has been given to procedure in the management of small plants. There is no one method of development, control and management for all businesses. Each company has its individual problems which can be solved only by methods which fit its requirements. The fundamental basis of procedure may be the same but details must be varied to suit each particular case. It is well to bear this fact in mind when attempting to refine one's business. Wholesale adoption of any system, without suitable adaptation, is practically useless.

The company of which the writer is manager has not yet installed all the procedure discussed in these articles. Further refinements are necessary and are under way in line with the general principles outlined. It may be of interest to describe some of the methods already in use, to point out the practical application which one plant has made of these principles.

The first step taken to reorganize management methods was to change the accounting system so that the books would be simple to keep, yet would give necessary information on financial, production and sales operations. An accountant was brought in and the problem explained. After a careful study he recommended the following procedure, which was adopted.

Three main ledgers were opened—an operating ledger, a production ledger and a general ledger. These ledgers carry the data listed below:

Operating Ledger

1. All items wich enter into the cost of the goods. These cover material, labor and burdens.
2. Gross sales, with allowances and returns.
3. Cash discounts on sales.
4. Sales expense; including salaries of sales office, salaries of salesmen, travelng expenses, commission, advertising, shipping, telephone and telegraph, etc.

5. Administration expense; including salaries of officers, office force, travel and entertainment, telephone and telegraph, etc.
6. Deductions from income; including interest on payables, federal taxes, and similar items.
7. Additions to income; such as interest on notes receivable, also interest on bank balance, discounts on purchases, etc.

The monthly balances from the operating ledger show the profit or loss for the month and the total to date.

Production Ledger

1. Value of raw material in the plant.
2. Value of goods in process.
3. Value of finished goods in the plant and on consignment.
4. Value of all supplies, etc.

This ledger also carries all department charges, such as supplies, supervision, repairs, wages, and proportional overhead, such as heat, light, maintenance, depreciation.

General Ledger

Contains all control accounts that bear on every phase of the business. Such accounts as:

1. Cash
2. Accounts receivable
3. Accounts payable
4. Control of operating ledger
5. Control of production ledger
6. Capital stock
7. Plant and equipment, etc.

Of course, the items which are entered in these ledgers come from vouchers, books and records which show the details and can be referred to if it is desired to check or investigate any special entry.

Original Records Used

These original records are the stores issue slips for the removal of raw material from stock, employees' time slips, original bills in voucher form covering purchases of materials and supplies, and similar data. Such slips are employed as part of the permanent record system to cut down

the clerical work otherwise required for transcribing, and so that one record will answer all purposes, if possible.

From the general ledger and such original books and records, it is an easy matter quickly to draw off in detail any information required for some special financial or cost investigation.

The next problem by the plant was the establishment of a cost system, which also meant one of stock control. Again outside help was secured, this time a management engineer of the Taylor school. He took charge of the work in an advisory capacity. The detailed study of methods in use at the time, and the introduction of changes recommended were made by one of our own men, who discussed each phase of the problem with the manager before making any changes. In this way the principles of the Taylor System were incorporated into methods which met the needs of the company. Nevertheless, much was adopted in the way of records, forms and procedure which later was found to be unnecessary. Gradually the whole method of costing and stock control was refined to a simple form, though Taylor principles were adhered to.

It would be of small benefit to describe the costing and stock control system and its development, for the methods required would differ for each company. The essential thing in introducing such a system is that the work of installing be done by the company's own employees, but under the guidance of men of experience in such fields. This procedure accomplishes two purposes—it insures the adaptation of methods to the particular needs of the plant, and it familiarizes men with the work who have to maintain the system.

The next step in reorganization was the development of a system of production control. Again Taylor's methods were adopted. A system was established embodying his principles. It was soon found that such a system, with all of its details, was too costly and cumbersome for the size of the plant and the extent of manufacturing operations. Many of the forms and specific procedures were therefore eventually discarded. For these was substituted a simple chart, or report, from which production is now planned.

Among the first things brought out by the study of production problems were the waste motion and loss of production caused by the existing arrangements of the machinery

in the plant. A new layout was drafted and the machines were so placed that the operator could look after two machines instead of one, as formerly, with no increase in effort. This rearrangement of manufacturing equipment has also made it possible to supply machines with material at a considerable saving in labor and handling, and has brought about other refinements never before possible.

The net result is that one man can now, without additional effort, produce over 100 per cent. more product than before the machines were rearranged. The rate of pay has been increased, of course, but the unit cost of production has been lowered to almost half of its former figure.

Besides the rearrangement of machinery the study of production methods led to many other economies throughout the plant, due to better supervision and an actual knowledge of performance.

CHAPTER NOTES

TORONTO

As Mr. Carruthers, who was to have addressed us on February 9, could not be present on that date, Mr. C. H. Black, of the Dunlop Tire and Rubber Goods Company, Ltd., and Mr. James Turner, C.A., of the T. Eaton Company, Ltd., kindly presented their papers that had been arranged for March 8.

Mr. Black's subject was "Factory Overheads and Their Distribution," and he covered it in a comprehensive way; his address is reproduced in this issue. Mr. Turner dealt with "Selling and Administrative Costs and Their Distribution"; this paper will be given in a later issue. The session brought one of the keenest discussions in the history of the chapter.

On the 23rd we had Mr. J. H. Lithgow, actuary of the Manufacturers' Life Insurance Company, describes how costs are figured in his business. While actuarial science is one of the most advanced in the whole field of business, it appears that a great deal is still left to chance. Mr. Lithgow's presentation was clear and instructive, and those pres-

ent took advantage of his courtesy to ask a good many questions.

Mr. Carruthers is still to be heard from in March, and the address of R. J. Dilworth, F.C.A., will complete the regular meeting for the season.

MONTREAL

SOME changes in the Chapter Programme have occurred. Illness and business matters caused the January meeting speakers to postpone their papers till a later date. Our hard working friend, Professor Thompson, C.A., of McGill, gave his paper, which was scheduled for February 11th. This meeting was characterized by small attendance, several members reporting sick.

Dave Farish was an unwilling participant in an argument between a street car and a C.N.R. locomotive, with painful consequences, through being on the street car's side. We are glad to report that he will be himself again very soon.

Due to the continued indisposition of Mr. Rhodes and the inability of Mr. Nixon to appear before us, the February 11th schedule was changed. Mr. O'Keefe, of the Canada Cement Company, read a complete paper on the Stores Handling Methods of his company, which was instructive and well received.

Professor Thompson stepped in and illustrated the working out of a cost question submitted in the last C.A. examination, "The Distribution of Overhead." This was very closely followed by the meeting, and some lively discussion followed in which several members took part.

We are looking forward to Part 3 of Mr. Rhodes' paper which is expected on March 11th.

A very instructive and busy meeting was held at McGill on February 25th. Mr. H. G. Pendock, C.G.A., Howard Smith Paper Mills, read a paper on Plant Depreciation which provoked much intelligent discussion. Definitions of obsolescence and depreciation were bandied about and the depreciation element of cost lead to the advisability of accepting business at a price which was not total overhead

earner. Some decided views were given on this point. Members who are connected with the paper industry decrying the present state of the market, but not admitting that they were breaking their own market by accepting business at non total overhead earnings. Different methods of arriving at the amount to be charged for depreciation and for obsolescence were illustrated and it appeared that the meeting decided the rates allowed by the Income Tax Act were fair.

Following this paper we discussed the Annual Chapter Dinner, and it was decided to hold this event in the Queen's Hotel on Tuesday, April 26th. We hope to welcome some visiting members on this occasion.

More appointments were made to the Convention Committees, which now stand as follows:—Chairman of Committees, G. C. Leroux; English Secretary, H. Kerrin, L.A., C.G.A.; French Secretary, L. P. Lortie; Programme and Meetings, Professor Thompson, C.A., and L. Peto; Hotel, J. A. Raymond; Exhibits, Messrs. McElroy and Rhodes; Entertainment Hotel, Armand de Tilly; Entertainment Outside, W. Carswell, C.A.; Universities, Professor Thompson, C.A., and L. J. Trottier; Transportation, N. Ostrander.

It was suggested, subject to approval of the Dominion Board, that the Convention be held the third week in September on Wednesday, Thursday and Friday.

POSITIONS DESIRED

No. 263—Age 45. Twenty-nine years' experience General Accounting and Cost Accounting. At present Cost and Production Manager for one of Canada's largest industries. Desires responsible position as Secretary, Treasurer, or Accountant in Toronto. Alexander Hamilton Institute student. Best references.